

21 April 1960

MEMORANDUM TO: Dr. Phillips

SUBJECT: Partichrome Processor

The general scheme of the Partichrome follows that outlined in the illustration entitled "Hypothetical BW Warning Device." The Partichrome processor includes the collection and treatment steps. Collection is by means of impaction; treatment consists of a series of steps (HCl, water, ethyl violet, water, xylene) for staining of bacteria. Scanning is accomplished by means of a scanner which together with the processor comprises the entire Partichrome.

The following comments on the processor refer to the inclosed drawing.

The function of the processor is to impact presized aerosolized material on a strip of cronar tape, apply a stain (ethyl violet) to the impacted material, and transport the tape to the scanner, which will be in the position marked "A." Figure 1 shows the reel of tape (B) and the bed along which the tape is moved (C).

It was found that in order to get satisfactory impaction and prevent the loss of material, it is necessary to apply a film of immersion oil to the tape before impaction. This oil is applied by means of a ball point pen type applicator (D).

After receiving the application of the oil, the film moves to the left where a doctor blade (E) spreads the oil. The tape then advances to position under the impactor (F). The impactor, using a flow rate of $17\frac{1}{2}$ liters per minute, deposits the material on the tape and then clean, heated air is directed at the field for the purpose of fixing the bacteria to the tape.

The tape then advances to the first staining cup (G) where the microscopic field is treated with 5% hydrochloric acid at 65°C. for one minute. After this operation, it advances to staining cup "H" where it undergoes a water rinse, ethyl violet stain and xylene rinse. It then advances to the scanner where the blue particles are counted.

Figure 2, showing a top view of the processor, shows the same components as described above. In addition to these components, the position of the timers (J) is shown. Since the instrument is still considered an experimental tool, adjustable timers were included so that we could conduct experiments with the staining procedure. If the staining procedure were completely resolved and there were no reasons to study the effect of changes in this procedure, this bank of adjustable timers could

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be replaced by four small clock motors, or even a lesser number with suitable gearing. The area shown behind the timers (K) shows the position of our reagent bottles.

Some of the problems which may appear upon the application of this instrument to practical "field" use are related to temperature control. We have found that at near freezing temperatures the oil becomes so viscous that it no longer serves as a practical collecting surface. The tolerances which must be held in temperature control are rather wide, and we found that encasing the impactor in a crude box with an electric bulb in it solved this problem. It should be emphasized here that this experiment was carried out with the impactor alone. The entire unit gives off enough heat so that it is expected that simply placing the unit in an insulated box will keep it warm enough.

The principle of the scanner and the means of achieving color differentiation is described in the paper written by Dr. Bolduan on "A Spectrally Discriminating Scanner for Counting Dyed Microscopic Particles in the Presence of Undyed Particles; Application to Bacterial Aerosols."



SOL S. NELSON